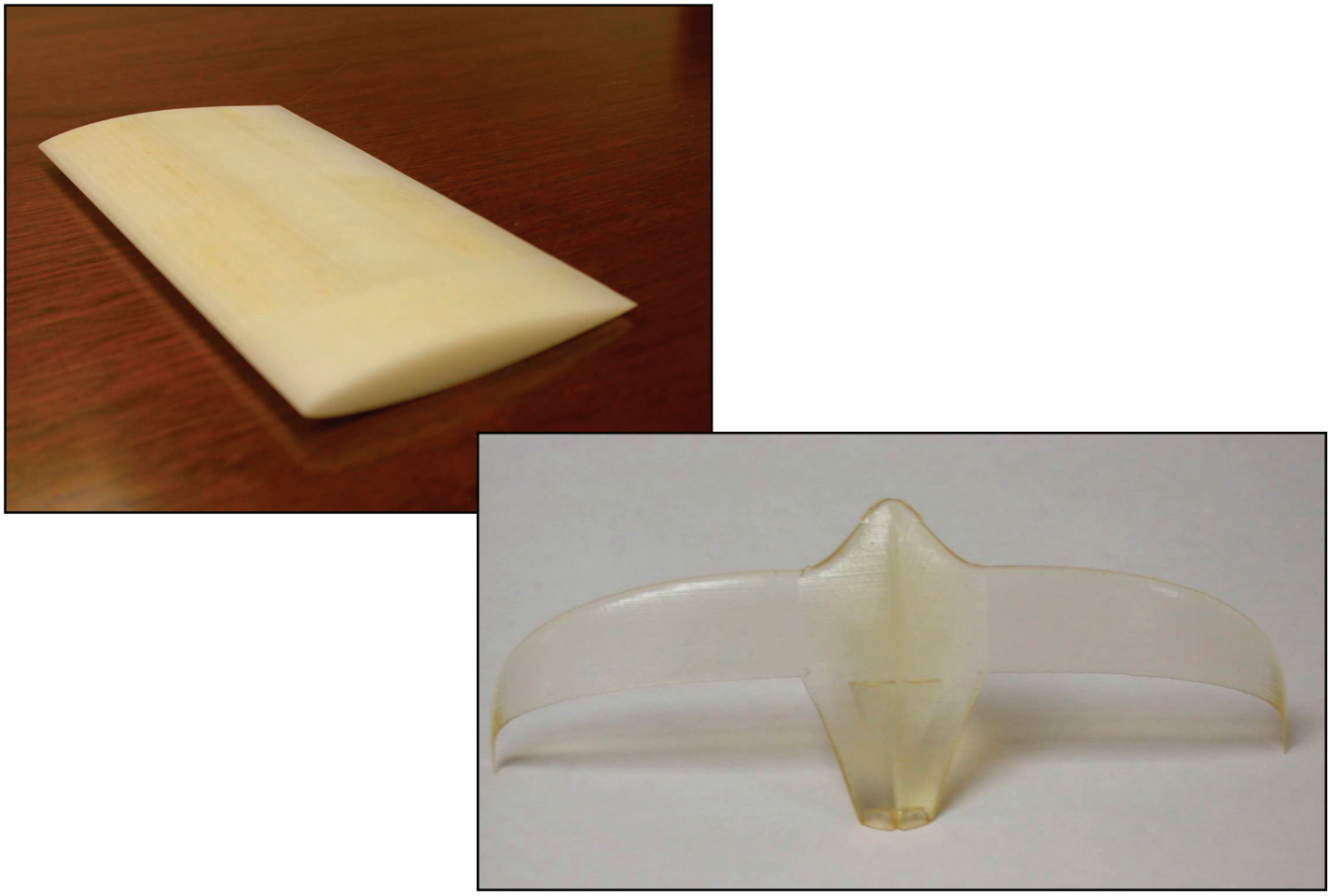
Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

SUCCESS STORY

AFRL EVALUATES RAPID PROTOTYPING TECHNOLOGIES FOR AERODYNAMIC RESEARCH



In the past, engineers needed months to manufacture aircraft models for experimental research in ground testing facilities. Recent innovations in rapid prototyping (RP) technology make it possible to produce models in weeks or even days, depending upon model complexity. By permitting concurrent studies of new technology concepts in wind tunnels and through computer simulation, this capability generates a faster, better response to warfighter needs.

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Accomplishment

AFRL evaluated industry's recent advancements in materials research to determine if any off-the-shelf, RP materials could meet the requirements of rapid aerodynamic technology assessment. This approach is substantially faster and less expensive than initiating an in-house research and development effort to create new RP materials.

During their initial search, AFRL engineers identified nine RP materials that could potentially meet requirements for fabrication of models used in wind tunnel experiments. These materials included six stereolithography materials and three stainless steel and bronze (i.e., metal)-sintered materials. During a series of tests, AFRL collected tensile, bending, bearing, and melting temperature data on the materials and discovered two of the stereolithography materials and one of the metal-sintered materials met all requirements.

Background

Stereolithography is an RP technology that uses a laser beam to produce a model by building plastic parts layer by layer from a container of liquid photopolymer. The laser solidifies the photopolymer and eventually completes a three-dimensional (3-D) model. Laser sintering is an RP technique that uses a high-powered laser to fuse together small particles of plastic, metal, or ceramic powders into a 3-D form.

Air Vehicles
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Additional Information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (VA-S-06-03)

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